Forest Health Review

May 2011

Pitch tubes resulting from black turpentine beetle attack on a drought-stressed shortleaf pine outside Virginia Department of Forestry headquarters in Charlottesville.

In this issue...

Greetings

It was a cold but generally dry fall and winter – following a blistering hot summer. The key issue for me over the last six months has been the widespread outbreak of bark beetle (Ips) spots, no doubt tied to the drought; thus the subject of my feature article. This has been occurring in other states as well, especially those hard hit by drought, such as Louisiana. And yet, southern pine beetle activity has remained minimal across the South. As I write this, we seem to have settled back into a rainy pattern, so, hopefully, the bark beetle activity will settle down. I look forward to significant rainfall carrying us through May, which will have the effect of keeping gypsy moth populations at bay. Current conditions indicate that it will likely be at least a couple of years before we see any significant resurgence of gypsy moth populations, and considerably longer than that if the spring rains are generous, allowing the gypsy moth fungus to reach its full potential. Of course, we are keeping our eyes open for where emerald ash borer might show up next, and staying alert for sudden oak death, thousand cankers disease and Asian long-horned beetle. As always, I hope you find this issue to be useful and informative.

Chris Asaro, forest health specialist, Headquarters

(434) 977-6555; chris.asaro@dof.virginia.gov

Drought and Ips Beetle Outbreaks

During the latter half of the summer of 2010, record-setting heat and significant drought conditions began to take a toll on Virginia's forests. Although southern pines are fairly drought tolerant, even they have their limits. As I mentioned in the last issue (November 2010), reporting from our field foresters and landowner calls related to scattered pine mortality were on the increase from late summer through early fall.

Since October and continuing through this past winter, I have visited several pine stands each month across the Piedmont and Coastal Plain at the request of foresters and/or landowners who have had concerns about dying trees. In most cases, what I've seen personally and what is being reported are small bark beetle spots, typically five to 20 trees, often

Loblolly pine trees weakened by drought and killed by Ips bark beetles.

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"We travel the Milky Way together, trees and men."

John Muir, 1894

only a few trees, scattered seemingly at random throughout a pine stand. In a majority of cases, these are Ips spots, sometimes with turpentine beetle. In one case in Caroline County, we were able to confirm southern pine beetle, but the spot was only 20 trees. Other southern pine beetle spots were reported, but generally they have been quite small as well.

Diagnosing bark beetle spots during the fall and winter seems to be the norm here in Virginia, and it can be challenging. Spots often are discovered long after the trees have been killed, which means the bark beetle culprits are long gone since they feed on live phloem tissue. Therefore, identification through recovery of an adult specimen is really difficult unless you happen to find a dead one. Secondly, in older spots, bark beetle gallery patterns become very difficult to see or diagnose due to a considerable overlap with the galleries of many secondary insects that arrive afterwards, such as large buprestid and cerambycid wood borers. Finally, what I've noticed during drought conditions is that trees often do not produce any pitch tubes when attacked, presumably because the oleoresin system is compromised. This is likely why many of the less aggressive species of Ips beetles are able to exploit trees in the first place. Without pitch tubes, green infested trees that might be on the periphery of the spot are undetectable as such. So, basically, you have old dead trees with red crowns and peeling bark, no yellow faders and no detectable green infested trees. Under these conditions, it's very hard to ascertain whether these spots are due to SPB or Ips, and whether they will resume activity once spring arrives.

Often then, we identify the culprit (Ips versus SPB) based on the pattern of tree mortality. Southern pine beetle spots are typically larger (at least 0.5 acre) with the affected trees all being in a cluster. On the other hand, Ips spots are characterized by scattered dead trees, one or a few in a cluster, with some distance between clusters. Sometimes clusters can be much larger, but usually not more than a half an acre of contiguous trees are killed. Widespread Ips problems, such as these, often materialize during extended drought periods, since considerable stress and a compromised resin system is what enables Ips to invade these trees. On the other hand, southern pine beetles do not seem to be as driven by drought cycles here, although they can certainly be more damaging if an SPB outbreak coincides with drought. But SPB can also attack and spread through an otherwise healthy stand if populations build up to a significant degree from one or two trees that might be stressed by lightning or a logging injury. These spots can grow and expand quickly, covering many acres during the warmer months.

VDOF foresters (from left to right Todd Groh, Dave Terwilliger, Tom Harlan, Kathleen Ogilvy) discuss stand management options with the site manager for the Virginia Department of Corrections (second from the left).

Therefore, as a guideline I tell folks, during this time of year, to keep an eye on your stand as it begins to warm up in April and May. If a small spot suddenly seems to expand quickly to cover acres, you probably have an SPB problem. If you continue to see a slow, gradual decline with a tree here and there dying over a period of months, it's likely due to Ips or black turpentine beetle (or both). If drought conditions dissipate and rainfall patterns return to normal, the Ips problems should slowly dissipate too, assuming no other stress factors, such as overstocking or a recent thinning that may have left mechanical wounds on residual trees, are a major issue.

With our current situation, my general sense is that most of the dead trees we've found this winter were killed last summer or fall, and, now that we are returning to a normal rainfall pattern, the worst of the bark beetle activity has run its course. My hope is that anything that survived through this winter is going to be just fine. Theoretically, any residual Ips populations are not going to be able to spread to healthy trees, which is why spots tend not to grow very large before they lose momentum. If all of this holds true, most of the damage I've seen will not greatly impact the overall management of

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"A man travels the world in search of what he needs and returns home to find it."

George Moore, 1900

UPDATES

Weather

The summer was exceptionally hot and dry, and though it was pretty cold this winter, the dry spell continued through February. We had quite a few minor snow storms, but most locations saw less than two to three inches each time, and only far eastern Virginia was hit with one snow storm around Christmas that approached a foot. By mid-February, drought conditions prevailed, and one week of bone-dry, gusty weather led to some serious fire activity across the Commonwealth. Fortunately, we seem to have settled into a wet pattern since then, with six inches of rain and counting for March across central Virginia, and more rain in the short-term forecast.

The table below presents the percent of average monthly precipitation and average degrees above (+) or below (-) monthly average temperature for each of nine geographic regions in Virginia (defined below). For monthly temperatures, a '0' indicates average.

Climate Change Watch

For the record, the NOAA National Climatic Data Center reported that 2010 was tied as the warmest year on record globally. It was also the wettest year on record globally. The word 'globally' is the key here – while your part of the country may have experienced record setting cold or drought like we did this winter in much of the Southeast, this is all averaged together with the many places that saw devastating and historic flooding – like what happened in Pakistan last year. 2010 was also the 34th consecutive year with global temperatures above the 20th century average. And a final bullet point – each year since 2000 has ranked as one of the 15 warmest on record since 1880 when records began.

Table 1

	SW	CW	NW	NP	CP	SP	NCP	SCP	ES
OCT Precip	50 to 130%	70 to 150%	70 to 150%	70 to 150%	70 to 150%	50 to 150%	50 to 130%	50 to 130%	110 to 200%
OCT Temp	-2 to +4	+1 to +5	0 to +3	+2 to +4	+2 to +5	+2 to +4	0 to +2	0 to +4	+2 to +4
NOV Precip	25 to 130%	25 to 80%	50 to 80%	70 to 90%	50 to 100%	25 to 110%	<25 to 50%	<25 to 50%	<25 to 50%
NOV Temp	-2 to +2	-1 to +1	-3 to -1	0 to +1	-1 to +1	-2 to 0	-2 to 0	-2 to 0	-1 to 0
DEC Precip	110 to 200%	100 to 150%	50 to 110%	50 to 90%	50 to 90%	70 to 150%	70 to 130%	70 to 130%	50 to 90%
DEC Temp	-10 to -8	-10 to -6	-10 to -6	-10 to -4	-10 to -6	-10 to -6	-10 to -6	-10 to -6	-10 to -8
JAN Precip	25 to 70%	25 to 50%	25 to 70%	25 to 70%	25 to 50%	25 to 50%	25 to 70%	25 to 100%	70 to 100%
JAN Temp	-4 to -2	-4 to 0	-4 to 0	-4 to 0	-4 to 0	-4 to 0	-6 to -2	-6 to -2	-6 to -4
FEB Precip	50 to 90%	25 to 70%	25 to 90%	50 to 90%	25 to 70%	25 to 70%	10 to 50%	10 to 50%	25 to 50%
FEB Temp	0 to +6	+2 to +6	0 to +4	+2 to +4	+2 to +6	+2 to +4	+2 to +6	+2 to +6	+2 to +4
MAR Precip	150 to 200%	130 to 150%	110 to 150%	130 to 150%	70 to 150%	70 to 150%	50 to 150%	50 to 90%	50 to 70%
MAR Temp	-1 to +4	-1 to +1	-1 to +1	0 to +2	-1 to +3	0 to +2	-1 to +3	-1 to +2	-1 to 0

SW = Southwest (Cumberland Gap to Abingdon to Blacksburg and Galax)
CW = Central West (Roanoke to Staunton)
NW = Northwest (Staunton to Winchester)
NP = Northern Piedmont (Loudoun/DC to Greene/Spotsylvania)
CP = Central Piedmont (Albemarle/Goochland to Bedford/Nottoway)
SP = Southern Piedmont (Campbell/Lunenburg to Henry/Mecklenburg)
NCP = North Coastal Plain (King George/Northumberland to Chesterfield/Newport News)
SCP = South Coastal Plan (Dinwiddie/Brunswick to Virginia Beach)
ES = Eastern Shore

"The great majority of scientific guesses turn out to be wrong."

Robert S. Morison, 1963

Loblolly pine plantations and hardwood forest cover the landscape in Buckingham County, with the Blue Ridge Mountains in the background.

SPB Prevention Program

This is a good time for me to remind our foresters that new rules went into effect May 1, 2010 that place a one-year time limit on job completion for all new pre-commercial thinning (PCT) and longleaf applications submitted after that date. As some of last year's applications begin to approach this deadline, we will send out letters to those landowners (and their associated VDOF forester) whose applications have not been completed within that year. The landowner will also be sent a six-month extension request (Form 89) to allow for additional time to have the work completed. If, after this extension is granted, the work is still not completed within six months, the project will be cancelled. The landowner may still reapply if funds are available, but will have to start the process over again. The reason for all of this is that we've had some problem with locking up a large proportion of our obligated funds into projects that don't get completed in a timely manner. In one case, we had to discontinue the PCT program for six months until we could account for more than 100 applications that were over two years old – most of which, ultimately, were cancelled after further inquiry. Hopefully this new time limit will keep things moving along and free up more money for other landowners interested in cost-share funds.

While our pre-commercial thinning efforts are still going strong (approximately 30,000 acres completed to date), our logger incentive program for first commercial thinnings on small tracts has been discontinued, since all remaining funds from our federal Redesign grant have been obligated. To date, we have paid for first thinnings on almost 2,000 acres since July 1, 2009. This number doesn't seem very impressive at first, but remember that all applications are for tracts under 40 acres in size, and many completed tracts were under 20 acres. We applied for a new Redesign grant but, to date, have not heard if it has been awarded. If we do get this funding, the logger incentive program will be reinstated.

Gypsy Moth

Since the crash of 2009, gypsy moth egg masses are very few and far between across the Commonwealth. Therefore, we are expecting very little significant defoliation this year, if any. VDACS will not be treating any acres this year with Bt or dimilin for suppression purposes. However, the Slow the Spread Program will still be actively treating selected locations in Southside and Southwest Virginia with pheromone flakes and a few of these locations may also receive a simultaneous application of Bt. What happens with gypsy moth over the next few years will depend a lot on the weather: spring rains will keep the gypsy moth fungus active and continue to suppress populations, while successive years of spring drought will eventually lead to a resurgence of populations.

"The age of innocent faith in science and technology may be over."

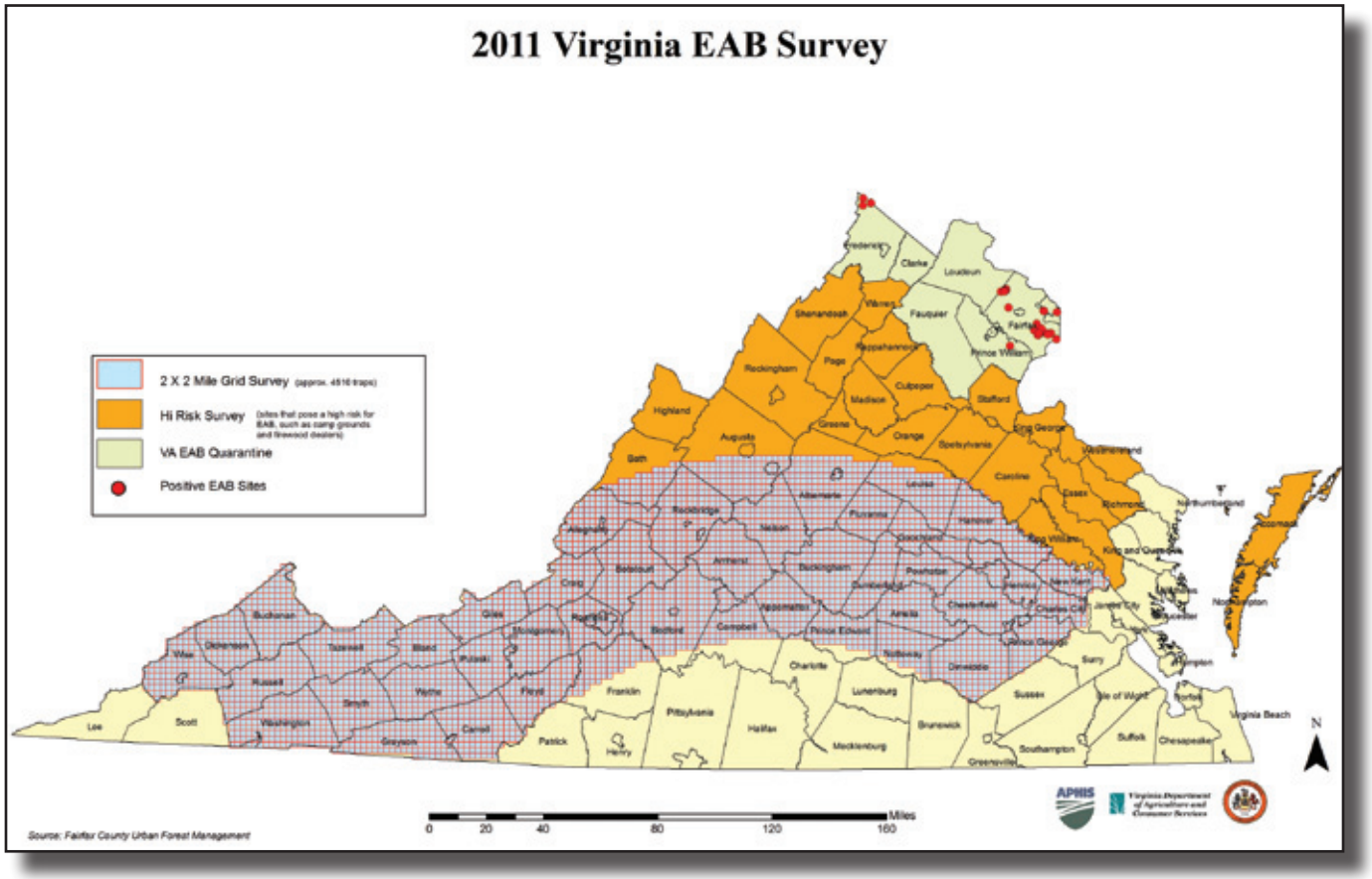
Barry Commoner, 1963

UPDATES

Emerald Ash Borer (EAB) Trapping

APHIS is paying contractors to continue the intensive trapping for EAB this year, but the area of emphasis will shift considerably from last year. Approximately 4,500 traps will be placed on a two-by-two-mile grid spanning most of southwest and central Virginia. Northern Virginia will still be trapped extensively, but not as intensively as last year. This heavy band of trapping is gradually moving southward in an attempt to try to anticipate the gradual spread of EAB and to detect it in new areas not yet under quarantine. With new populations found in West Virginia and Knoxville, TN, last year, it is feared that a new EAB 'front' will be established in other parts of Virginia.

Emerald ash borer has been identified in four of seven quarantined counties in northern Virginia. Since the first of these detections in 2008, noticeable spread of the insect has not been as rapid here compared to what was experienced in the Midwest. This may be due in part to the effects of the quarantine regulations, as well as the relatively low abundance of ash compared to the Midwest. It's also possible, however, that a great deal of additional spread has occurred in Virginia but, due to the cryptic nature of EAB in the early phases of infestation, these newer infestations have remained undetected thus far. The shift and expansion in trapping effort this year will likely reinforce or revise our knowledge of EAB distribution in Virginia.



"In biology, it is one stupefaction after another."

Lewis Thomas, 1983

Biological Control of Hemlock Woolly Adelgid (HWA) at Sandy Point State Forest

In the last issue, I mentioned our efforts to use biological control on some state forest and park lands to help control HWA. This past November, researchers from Virginia Tech Entomology Professor Scott Salom's lab released the HWA predator *Laricobius nigrinus* on the Channels State Forest in southwest Virginia. I also obtained 1,000 of these beetles from Virginia Tech and released them at Sandy Point State Forest in eastern Virginia, with the help of Dennis Gaston, State Forest manager for the Eastern Region. Finally, I continue to monitor the hemlock trees at James River State Park, where a release occurred in November 2005. The trees at James River and Sandy Point are still in fair to excellent condition overall, while the ones at Channels are generally showing considerable signs of decline. While it is difficult to attribute anything to the predator releases at this stage, it is interesting that the hemlocks seem to be doing pretty well at the two locations where the hemlock represents an isolated population outside of its core range (James River and Sandy Point). But at Channels, where hemlock is well within its native range, hemlock seems to be suffering more. This is all anecdotal, of course, and there could be many reasons why this is so – including site differences, genetic differences among the hemlock populations, adelgid pressure and other variables. But it is probable that the infestations at James River and Sandy Point are at least as old as those at Channels – so understanding why these hemlocks have shown lower amounts of decline is important.

Large VDOF Turnout at VA Association of Forest Health Professionals Meeting in Williamsburg

I provided background details of this meeting in the last issue. Including myself, there were 20 VDOF employees in attendance – mostly foresters from the Eastern Region. We had some very positive feedback overall due to the excellent speakers and presentations throughout the two-day event. Dennis Gaston gave a great presentation on the forest management and conservation activities on our State Forests, with a focus on his area in the Eastern Region. There were also talks on emerald ash borer, Asian longhorned beetle, chestnut restoration, oak decline, thousand cankers disease, gypsy moth and many others. Full credits for pesticide recertification, as well as ISA and SAF credits, were offered. Look for this annual meeting in an area near you during the first Monday-Tuesday in February. Assuming I have the funds, I will pay registration costs for all VDOF personnel interested in future meetings.

Pesticide Recertification Course

VDOF will be offering another pesticide recertification course in Charlottesville on May 24th for categories 2, 6, 10 and 60. We used to do this every other year – but due to significant staffing cuts in Virginia Cooperative Extension, fewer of these courses are available than in past years.

Lands for Tomorrow Conference – Non-native Invasive (NNI) Weed Course

During the last week of June, I will be conducting a four-hour class on NNI forest weed identification and management at the Lands for Tomorrow Conference at Longwood University in Farmville. There is a growing need to address this problem, and the first step is to be able to identify them. I hope to do this with the assistance of John Townsend, a botanist with DCR. On the management side, we are primarily talking about mechanical and/or chemical control. Most weed species can be controlled with at least one of numerous herbicide formulations – and information about which herbicides work best for which weeds is widely available from a number of publications. The key point is to determine when using herbicides is feasible and practical, and, when not, what other options can be used to mitigate impacts.

"The state of the economy over most of the sweep of human history was, by the standards of economists today, stagnation."

Paul R. Ehrlich, 1990

What's This?

If you spend any time in oak-hickory forests in Virginia (who doesn't?) and you don't recognize this, you should. It's a fungus known to pathologists as hypoxylon canker, caused by *Hypoxylon punctulatum*. This fungus can be seen all over Virginia, affecting primarily oaks, but is also known to colonize birch, hickory, chestnut, beech and elm.

Hypoxylon canker fungus found on a dead oak tree in Albemarle County.

This fungus is ubiquitous throughout our forests but does not act as an aggressive pathogen. Typically, it resides in healthy oak tissues as an 'endophyte', unnoticeable until environmental stress, particularly drought, releases this opportunistic pathogen. The fungus becomes visible after a mat of tissue called a 'stroma' develops in the cambial region, pushing outward as it grows so that the bark begins to flake off the tree. Once exposed, the stromata (pl.) release millions of spores into the air. Stromata can be black to brown, or gray depending on whether the sexual or asexual form of the fungus is present. Exposed stromata typically occur some months after the tree is dead; therefore hypoxylon canker is rarely detected when a tree appears to be healthy.

The prevalence of hypoxylon across the Commonwealth and in other eastern states can be seen not as an indication of an aggressive pathogen at work but, rather, as an indication of cumulative environmental stress. Between 2005 and 2010, Virginia has experienced significant periods of drought and above average heat waves. The prevalence of hypoxylon canker across the landscape is closely associated with these conditions, as well as the abundance of oak, which comprises over a third of our forest volume statewide. Typically, affected trees are found individually rather than in large clumps, which reflect the random nature of drought impacts relative to a tree's position in the landscape. Next time you take a walk in the woods, keep an eye open for this common sign of environmental stress in the landscape.

"Without a trace of irony I can say I have been blessed with brilliant enemies."

Edward O Wilson, 1994

What's Killing White Pine in the Highlands of Western Virginia?

In the spring of 2006, I was contacted by VDOF forester John Wright about an unusual 'decline' syndrome in eastern white pine that he had been watching closely. John covers Alleghany, Bath and Highland counties in western Virginia, an area where white pine is very abundant as a plantation tree and as a natural species that grows in mixed and pure stands along the ridges and valleys of that mountainous terrain. What I observed did not seem alarming at first, but certainly unusual and interesting. It seemed that needles on individual branches on an otherwise green and healthy-looking pine tree would turn brown, and this occurred on seedlings, sapling, mid-size and large trees. After observing and collecting samples, I could find no obvious cause for this phenomenon, and other more pressing things diverted my attention away from it for a while.

Dead and dying white pines on a hillside in Bath County.

Over the course of the year, John's close observations made it apparent to him that some of the trees that began showing these symptoms a year ago were now dead. This included saplings and large trees. Returning to those locations in the fall of 2006, I confirmed this and was puzzled that so many different age and size classes could be affected by this simultaneously. This is very unusual and rarely seen – at least if a native insect or pathogen is the culprit. White pine regeneration is very shade tolerant and resilient and should not just be browning up. Upon closer inspection, most of these dead trees or branches had what looked to be canker-like swellings with cracked bark and leaking resin, particularly along the nodes where a whorl of branchlets are attached to the branch. Yet there were no holes or other signs of insect boring. It was time to get serious and take a hard look at what was going on.

One of many stem cankers found on a dead white pine sapling.

I collected some samples of diseased branches and brought them back to the lab. But, I needed help from a forest pathologist, so I called Michelle Cram, a scientist with the USDA Forest Service in Athens, Ga., whom I knew from my past employment down there. Michelle works with State and Private Forestry, so a small part of her duties includes working with state cooperators on forest disease problems. She came up here in October 2006 to collect branch samples and tried to culture out any fungal pathogens that might be responsible for the decline.

"Historical turning points seldom have dramatic beginnings. Rather, they start quietly in the minds of ordinary people."

Alston Chase, 1995

What's Killing White Pine in the Highlands, from page 9

From Michelle's field observations and fungal isolations, she was able to rule out root diseases, a couple of which (annosum, procerum) are known to cause mortality in white pine. Typically, procerum root disease causes whole trees to fade and then brown up within a matter of weeks – unlike the situation here. Root diseases in the forest are also much more typical on larger, older trees rather than saplings. After returning back to her lab, she worked on isolations from stem cankers over the next few months, and, with assistance from other specialists from the University of Wisconsin, she identified the following fungal organisms:

1. *Fusarium chlamydosporium*
2. *Fusarium acuminatum*
3. *Diplodia scrobiculata* (also known as *Diplodea pinea*, *Sphaeropsis sapinea* or *Diplodia tip blight*)

While *Diplodia* tip blight is known to cause branch death in other pine species, it is not known as an aggressive pathogen, particularly in natural white pine stands. Likewise, the other fungal species are weak, opportunistic pathogens that invade tissue on stressed hosts.

Michelle returned to Virginia in May 2007 to investigate further. At this time, we both noted tiny fruiting bodies (perithecia) from an unknown fungus associated with many of the branch cankers. Later examination by Michelle in the laboratory confirmed that these spore-producing structures were from yet another species called *Caliciopsis pinea* (pine canker). Once we knew to look for these structures, we found them almost everywhere we saw branch cankers. Although eastern and western white pines are the main hosts of this pathogen, the literature on it is very scant and most is from the 1930s. Could this have been the underlying cause of the problem?

Michelle made a final discovery as she was cutting through the canker tissue back in her lab: scale insects were embedded deep in the cracks within the canker. What kind of scales? We sent samples to a colleague and scale specialist, Dr. Greg Hodges, at the Florida Department of Agriculture. He tentatively identified the scale as *Matsucoccus gallicolus*, the pine twig gall scale. However, by Greg's own admission, he was uncertain of the species since the scale samples we sent him were immature; confirmation to species is difficult without a full adult specimen. So, although we are certain of the genus *Matsucoccus*, the species has yet to be confirmed. Pine twig gall scale is a possibility, but the known host list includes only hard pines, not soft pines like white pine, which puts this into doubt. Likely, we would need to collect scales in the summer to obtain an adult. Admittedly, I had not followed up on this over the years like I had meant to (I get pretty busy in the summer!), so I really need to get out there more regularly and try to collect some adult scales from these cankers if I can find them.

Dead white pine saplings in Bath County are due to unknown causes.

Michelle's guess is that the scale insect is the primary culprit causing the initial damage and weakening the tree to such an extent that common opportunistic fungi are able to invade and cause further decline. I can certainly buy that explanation, but first we need to know more about this scale insect. We have a lot of leads here but few firm answers.

For some time, I thought that some of this decline could be explained by abiotic factors, particularly drought stress over the last five to 10 years. Those of you who read this newsletter regularly know that I often invoke drought as an underlying problem for many issues – particularly oak decline and secondary pine bark beetle outbreaks. However, that didn't really hold up here due to the random nature of this phenomenon – it impacted pines of all age classes; it was seen on ridges, mid-slopes and in valleys, and it occurred within forest stands, on the edges and in open grown trees.

Once again, however, I had to put this issue on the back burner until John contacted me again this spring and said the problem was noticeably worse. After travelling through a large swath of Highland and Bath counties with John

"Science invites us to let the facts in even when they don't conform to our preconceptions."

Carl Sagan, 1996

this past March, I would have to agree! Signs of this decline are literally everywhere, not always dramatic or even obvious if you're not looking for it, but if you are, it's there – a dead branch here; a dead sapling there; a clump of dead mature trees over yonder. If one assumes that these early signs will lead to more decline and mortality, then there are going to be a lot more dead white pines in the near future. Other locations that I had been to in the past where there may have been one or a few dead trees now have many. In particular, a white pine plantation in the middle of the small village of Bacova in Bath County has deteriorated significantly. Two years ago, there were only a few signs of the condition on the edge of the stand. Now, it looks as though 10 to 15 percent of the trees within the stand are dead. Although white pine is typically grown in an overstocked condition and gradual decline in mature stands is not unheard of – the seemingly random and rapid nature of this decline is very unusual. After all, this is 'white pine country.'

The situation has really got my attention now, and I find myself echoing John Wright's fears that it could get a lot worse and possibly become quite dramatic. More and more calls are coming to him from concerned landowners. It's time I brought this to more people's attention so that I can get others involved in solving this mystery. I have already contacted some entomologists and pathologists from Virginia Tech and invited them to take a closer look. Even if we figure it out, I'm not sure what can be done other than replace white pine with other species (Norway spruce?) – but a big concern is that any sudden loss of all the natural white pine growing among these mountains and valleys will lead to further proliferation of invasive weeds.

Dead branches on these white pines in Bath County indicate these trees will be completely dead within a couple of years.

Black scale insects (*Matsucoccus* sp.) found embedded within stem canker tissue on white pine.

Black fruiting structures (perithecia) of the fungus *Caliciopsis pinea* emerge from a stem canker on white pine.

"In a longleaf forest, miles of trees forever fade into a brilliant salmon sunset and reappear the next dawn as a battalion marching out of fog."

Janisse Ray, 1999

Drought and Ips Beetle Outbreaks, from page 3

the stand and no salvage will be necessary. The Ips will have effectively served to thin the stand out a little more, allowing plenty of growing space for the remaining trees.

On the other hand, if we find ourselves in another very hot, dry spell in 2011 like we saw last year, things could quickly worsen. Even without SPB, Ips is capable of causing a considerable amount of damage by itself if the conditions are right. The problem is, spots usually remain small and scattered so there is no practical control measure to disrupt spot growth like with SPB. You basically just have to keep an eye on things until the quantity of tree mortality reaches a critical threshold, before you decide to clearcut. Even that may not be a feasible option if there is no market for the pine, so this is never an easy decision and every landowner has his or her own level of tolerance for accepting losses. In the current situation, I haven't personally seen any stands where such drastic action needs to be taken yet, but I have seen stands where I would recommend salvage if they got any worse. Hopefully my hunch is correct and the worst is over, but time will tell.

Consulting forester John McGruder (right) discusses management options with landowner John Burke (second from right) and associates in Caroline County after locating a small southern pine beetle spot.

Virginia Department of Forestry
900 Natural Resources Drive, Suite 800
Charlottesville, Virginia 22903
Phone: (434) 977-6555
www.dof.virginia.gov

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Virginia Department of Forestry
900 Natural Resources Drive, Suite 800
Charlottesville, VA 22903